FACULTY
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Assignment of bachelor's thesis

Title:	Implementation of B-trees on GPU
Student:	Tat Dat Duong
Supervisor:	Ing. Tomáš Oberhuber, Ph.D.
Study program:	Informatics
Branch / specialization:	Computer Science
Department:	Department of Theoretical Computer Science
Validity:	until the end of summer semester 2021/2022

Instructions

1. Familiarise with the basics of programming of GPUs using CUDA.
2. Familiarise with the development of parallel algorithms using TNL library (www.tnl-project.org).
3. Learn and understand available algorithms and data structures (see [1] for example) for B-trees on GPUs.
4. Implement chosen data structures in TNL with the option of run on both GPU and CPU.
5. Implement unit tests for verifying the correct functionality of chosen algorithms.
6. Measure performance speed-ups of implemented data structures compared to suitable containers from STL library or similar data structures on datasets arising from generation of unstructured numerical meshes.

[1] M. A. Awad, S. Ashkiani, R. Johnson, M. Farah-Colton, J. D. Owens, Engineering a high-performance GPU B-Tree, PPoPP '19: Proceedings of the 24th Symposium on Principles and Practice of Parallel Programming, p. 145-157, 2019.

Electronically approved by doc. Ing. Jan Janoušek, Ph.D. on 4 January 2021 in Prague.